

MAGNETISM AND ELECTRICITY PUZZLERS



David W. Mathew

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C.C. PUBLICATIONS, INC.

Puzzlers software operates on Apple* IIe, Apple IIc, Apple II + , and Franklin computers. The software runs on a single disk drive.

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C.C. Publications, Inc.

P.O. Box 23699

Tigard, Oregon 97223

Illustrated by Carol Webb Atherly

Programmed by Oracle Computing Systems, Inc.

Stephen M. Klink, Programmer

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INTRODUCTION

Puzzlers improves cognitive development through activities that build deductive reasoning and memory retention skills. The program requires students to solve puzzles by deducing answers from a series of clues, and entering each answer into the correct box of a matrix (the Puzzler grid). Each Puzzler is based on a specific science theme, so students also learn basic scientific facts, and a science glossary provides definitions of relevant scientific terms.

Puzzlers is appropriate for students in grades four and above. No special knowledge of science is required to complete a Puzzler; neither are any typing or spelling skills necessary.

The package includes one disk and a user's manual. The disk is compatible with Apple II + , Apple IIe, Apple IIc, and Franklin computers. The manual includes content summaries of all **Puzzlers** packages available from C.C. Publications, Inc.

Design

The program disk contains 16 deductive logic puzzles, each presented in a game format. (Generally, the initial Puzzlers are simplest.) The objective of the game is to fill in all the Puzzler squares correctly. An optional on-disk demonstration guides students through the steps required to solve a Puzzler:

1. Read the directions.
2. Read the clues.
3. Study the Puzzler.
4. Enter an answer into the correct square of the Puzzler.
5. Check the answer.

Students switch between the clues screen and the Puzzler screen until all the Puzzler squares are filled correctly. A friendly professor named Ned applauds successful completion and also provides help when necessary. At any time, students may refer to a glossary of selected scientific terms.

Important Features

1. The **Puzzlers** program requires students to use deductive logic to solve each puzzle.
2. Each disk in the **Puzzlers** series is based on a specific scientific theme.

3. Students check each answer and receive immediate feedback.
4. At any time during the game, students can refer to a glossary of scientific terms.
5. Students can operate the program independently.
6. Students control their own pace.
7. Students have easy access to any part of the program.
8. Full color, high-resolution graphics enhance each Puzzler.
9. An easy-to-use help menu is accessible from any part of the program.
10. Students are required to learn a limited number of keys.
11. Students receive onscreen instruction.
12. An optional on-disk tutorial teaches students how to solve a Puzzler.
13. Students have the opportunity to correct their errors.
14. The text is programmed in upper and lower case.

OPERATION

Technical Information

Puzzlers software operates on Apple II + , Apple IIe, Apple IIc, and Franklin computers. The software runs on a single disk drive.

Loading

1. Make sure the power switch is off.
2. Insert the *Puzzlers* disk into the disk drive. If there are two disk drives, insert the disk into drive #1.
3. Turn the power switch on. Turn on the monitor. Check to see that the CAPS LOCK is down.
4. Loading is complete when you are asked to type your name.

How to Solve a Puzzler

This tutorial is a more detailed version of the demonstration that is found on the disk. It is a step-by-step guide to using the *Puzzlers* program. The following steps begin where instructions for loading leave off.

1. **Type your name when Ned requests it and then press RETURN.**
Make sure the CAPS LOCK is down.
2. **Press an arrow key to select "Play the game."**
Note that any arrow key will move a highlight bar. If you choose "Demonstration" by mistake, just press CONTROL-RESET to start over. (This is called *rebooting*.)

3. **Press an arrow key to select a Puzzler and press RETURN.**

Choose the first Puzzler.

4. **Read the directions on the screen.**

Every Puzzler has an introductory screen that contains directions. Once you advance beyond this screen, you must refer to the help menu to reread the directions.

Note: From this point on, you can refer to the help menu by pressing H. You may also refer to the glossary, from the clues screen or the directions screen, by pressing G.

5. **Press the space bar.**

6. **Read the clues.**

The sentences are clues to solving the Puzzler.

7. **Use the arrow keys to box any bold word or phrase (answer).**

Each clue contains a word or phrase in bold letters that you can box by pressing the arrow keys. These words are answers that fit into squares in the Puzzler grid (on the next screen).

8. **Press the space bar.**

9. **Use the arrow keys to choose the correct square for the answer.**

The answer that you chose in Step #7 is displayed in a box in the upper left-hand corner of the screen. Pick the square in which this answer belongs. If you can't decide where it belongs, go back to the clues by pressing the space bar. You can always switch between the clues and the Puzzler grid by pressing the space bar.

10. **Press E to enter your answer in the square.**

11. **Press C to check whether your answer is correct.**

The program tells you right away if your answer is correct or incorrect. A wrong answer fades from the screen.

Note: You can delete an answer from the Puzzler grid before checking it by pressing D, or the Delete key if your machine has one. You may also enter your answer in the grid by pressing the RETURN key instead of the E key.

12. **Press the space bar to return to the clues screen.**

Repeat steps 6–11 until all the Puzzler squares are filled in correctly. Remember to use the space bar to switch between the clues screen and the Puzzler grid.

13. **Upon completion, you are given the option to continue with another Puzzler, or to exit the game.**

Glossary

To use the glossary, press G (while you are solving a Puzzler).

Selected scientific terms in the glossary are listed in alphabetical order. The glossary is preceded by an index that allows you to go directly to the desired page; use an arrow key to select the page and press RETURN.

Once inside the glossary, you can move through it by pressing any arrow key, or you can return to the index by pressing I. At any time when you are using the glossary, you can return to your Puzzler (press P), or ask for help (press H).

Exit Game

You can exit the program in several ways: via the help menu, after you complete a Puzzler, or by removing the disk from the disk drive and turning off the machine. Never remove a disk when the disk light is on.

Help Menu

The help menu contains the following options:

HELP DEMONSTRATION Presents a tutorial that shows you how to play a Puzzler.

HELP DIRECTIONS Displays the directions screen of the Puzzler you are playing at the time.

HELP GO BACK Returns you to the Puzzler you are currently playing.

HELP GLOSSARY Displays the glossary index.

HELP NEW PUZZLER Displays the list of Puzzlers.

HELP COMMANDS Shows you a list of various keys and what they do.

HELP LEAVE Ends the session.

Commands Summary

Space bar:	Switch between screens.
Arrow keys:	Select Puzzler squares. Select clues. Select glossary page. Page through glossary.
RETURN key:	Carriage return. Enter answer.
Delete key:	Delete answer (if your keyboard has a Delete key).
E:	Enter answer.
C:	Check answer.
D:	Delete answer.
P:	Return to Puzzler.
G:	Glossary.
I:	Glossary index.
H:	Help menu.
CONTROL-RESET:	Reboot program.

APPENDICES

A. Content Summary of *Weather Puzzlers*

1. *FORECAST* shows how wind direction and air pressure are related to forecasting the weather.
2. *SEA BREEZE* explains how the warming and cooling of the land and sea affect the flow of air between them.
3. *THERMOMETERS* compares the Fahrenheit and Celsius scales using the different physical states of water as examples.
4. *METERS* explains the uses and characteristics of three meteorological gauges: thermometer, anemometer, and barometer.
5. *HOT AIR/COLD AIR* shows how heat and cold affect the volume, weight, pressure, and movement of air.
6. *FRONTS* describes the movement of air masses during a cold front, a warm front, a stationary front, and an occluded front.
7. *STORMS* identifies the wind speed, precipitation, and season associated with three different storms: blizzards, hurricanes, and thunderstorms.
8. *WEATHER BALLOONS* illustrates the utilization of weather balloons for measuring wind speed, air pollution, and freezing level.
9. *SATELLITES* describes the orbital positions, launch years, and respective missions of three U.S. satellites.
10. *OUTDOOR EVENT* gives examples of various forecasts across the country.
11. *GROWERS* illustrates the dependent relationship between farming and weather conditions.
12. *SEASONS* describes the weather, tree foliage, and length of days associated with each of the four seasons.
13. *MERCHANT MARINE* gives examples of varying weather conditions experienced by cargo ships traveling the high seas.
14. *WIND* identifies the kind of wind, wind speed, and visible wind determination found at three Florida weather stations using Beaufort Scale criteria.
15. *WEATHERPERSON* compares the methods of three television weatherpersons as they forecast the weather using different instruments.
16. *CLOUDS* teaches the appearance, altitude level, and potential forecast of four cloud types: stratus, cumulus, altocumulus, and cirrus.

B. Content Summary of Matter and Energy Puzzlers

1. *SUNSHINE* demonstrates the reflective and absorptive properties of light colors (white) and dark colors (black).
2. *HORSES* compares the difference in weight of six common substances made into toy horses.
3. *SOLAR ENERGY* gives four tangible examples of solar energy converted to work energy, specifying the collecting agent and geographic area where this would occur.
4. *PHYSICAL CHANGES* specifies two substances (water and carbon dioxide) that may exist in one or more physical states.
5. *CLOCKS* uses three different clocks to illustrate where potential energy is stored, kinetic energy is released, and sound energy is emitted.
6. *PURE SUBSTANCES* gives examples of nine household items made from copper, aluminum, and carbon.
7. *SOUND ENERGY* traces the path of each of four sounds from its source through a converter to a logical place where each sound might be heard.
8. *MOVING TOYS* identifies the energy sources and energy converters that power four moving toys.
9. *AT THE FAIR* requires students to identify which of nine common objects found at a fair is a solid, liquid, or gas.
10. *UTILITIES* cites the various sources of electric power used by four major cities.
11. *HYDROELECTRIC DAMS* requires students to specify the location of four U.S. dams.
12. *GRAVITY* shows the relationship between gravity and the height from which something is dropped.
13. *HEATING ENERGY* teaches the sources of home heating in four countries.
14. *MILLS* illustrates the energy source used to power three old-fashioned mills.
15. *COMPOUNDS* requires students to specify the number of hydrogen, carbon, and oxygen atoms in four common substances.
16. *ATOMS* teaches the three major parts of the atom by requiring students to identify the number of protons, neutrons, and electrons in four elements.

C. Content Summary of *Magnetism and Electricity Puzzlers*

1. *MAGNETIC POLES* explains the magnetic properties of opposite and like poles.
2. *MAGNETIC METALS* distinguishes between the magnetic or non-magnetic properties of four common metals.
3. *WHAT MAGNETS DO* gives examples of some useful things that magnets and electromagnets can do.
4. *MAGNETIC MEDIA* explains that magnets can store information and identifies various magnetic media such as floppy disks, cassettes, and videotape.
5. *ATOMS* explains the electric attraction between atomic particles.
6. *STATIC ELECTRICITY* determines the static electric charge six common objects emit when rubbed against each other.
7. *ELECTRIC PIONEERS* introduces four pioneers of electricity, noting what each scientist worked with and the property of electricity he discovered.
8. *CONDUCT/INSULATE* demonstrates methods for determining whether eight objects are conductors or insulators.
9. *DRY CELL/WET CELL* explains the difference between a wet cell and a dry cell, and identifies six common batteries.
10. *AC/DC* defines the acronyms AC and DC, and specifies which of these two currents is used in eight household items.
11. *COMPONENTS* introduces the jargon of electric circuitry and requires students to identify the components and legs in three circuits.
12. *HOUSE IN PARALLEL* defines a parallel circuit and gives examples of 12 household items wired in parallel circuits.
13. *SERIES CIRCUIT* defines a series circuit and requires students to identify the components in three series circuits.
14. *POWER TRANSMISSION* traces the transmission of power from three power plants to three cities where the energy is used.
15. *MORE PIONEERS* introduces four pioneers of electricity, noting the materials each one worked with and the electric machine he invented.
16. *MORSE CODE* teaches Morse Code by requiring students to decode a series of dots and dashes.

D. Content Summary of *Sound and Light Puzzlers*

1. *ANALOGY* shows how sound and light are related by identifying analogous characteristics.
2. *SOUND DURATION* gives examples of prolonged and explosive sounds.
3. *CONDUCTORS* gives examples of sources, conductors, and receivers of sound.
4. *BOUNCING SOUND* illustrates the acoustically reflective or absorptive qualities of various common materials.
5. *SOUND FREQUENCY* shows the relationship between the mass, length, and tension of a sound source and the pitch produced.
6. *PITCH* gives examples of 12 musical instruments and indicates whether they have high, medium, or low pitch.
7. *THE EAR* identifies the parts of the ear and their functions.
8. *COLORS OF LIGHT* identifies the primary colors of light and a number of secondary colors made by combining the primaries.
9. *COLORS OF PIGMENT* illustrates the primary colors of pigment, as well as a number of secondary colors made by combining these.
10. *OPTICS* introduces convex and concave mirrors and lenses, and shows which make objects appear larger or smaller.
11. *SIGNAL FLAGS* illustrates how color is used to communicate over a long distance.
12. *EYE OF THE CAMERA* points out similarities between the mechanisms of the eye and a camera.
13. *LIGHT AT NIGHT* gives examples of how we use natural or artificial light to see at night.
14. *ON STAGE* requires students to create the proper lighting for a stage play by combining primary colors of light.
15. *MIRRORS* illustrates the use of flat, concave, and convex mirrors in everyday life.
16. *CLEAR/UNCLEAR* employs common household items to present the concepts of translucent, transparent, and opaque.

